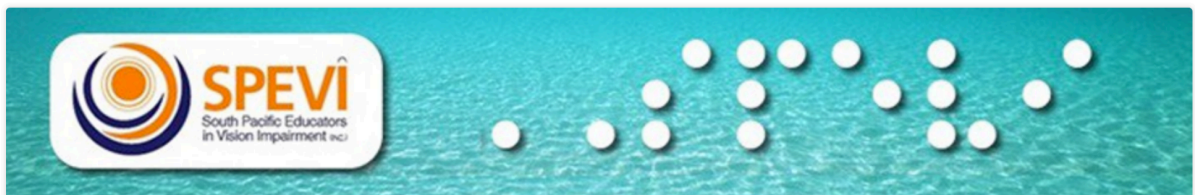


# **Severity Indicators of Vision Impairment**

**And interpreting the results of visual acuity testing**

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## Severity Indicators of Vision Impairment

This document provides guidance in the determination of the severity of vision impairment based on the clinical results of near vision, distance visual acuity and visual fields. This determination is grounded in The World Health Organization International Classification of Disease, Version 10 (ICD-10) (See Appendix 1). The following colour key is used in this guide to indicate the severity of the vision impairment.

<b>Mild vision impairment</b>
<b>Moderate vision impairment</b>
<b>Severe vision impairment</b>
<b>Blindness</b>

### 1. Definition of Vision Impairment

Vision impairment is defined as reduced vision that cannot be restored or corrected by glasses, contact lenses, surgery or pharmacological means. Vision impairment can be caused by conditions that affect the eye, the connections between the eye and brain, or parts of the brain involved with vision. Vision impairment can be exacerbated by environmental conditions, and an individual's general wellness and cognitive functioning. Vision impairment commonly occurs in individuals who have other disabilities.

### 2. Definition of Visual Acuity

Visual acuity is defined as the finest detail that can be seen. It is a subjective clinical measurement which provides a baseline for understanding an individual's vision. It is tested at two distances, one where the eye is focusing (near vision) and the other, where the eye's focusing is relaxed (distance visual acuity).

#### 2.1 Testing visual acuity in children

Testing visual acuity in children and in individuals who are unable to communicate effectively can be very challenging, and the clinician will often use a range of tests at a variety of distances. It is common that visual acuity is approximated in children under 36 months, rather than a definitive result being achieved.

Standard visual acuity tests used for children are summarised in Appendix 2.

#### 2.2 Testing visual acuity in adults

Standard visual acuity tests used for adults include the Snellens Acuity Chart and the LogMAR Chart. Snellens notations used for recording appear in Table 4 and LogMAR notations used for recording appear in Table 5. Use of the Snellens and LogMAR tests will be determined by the individual's capacity to participate in testing.

### 3. Interpreting the Results of Visual Acuity Testing

Visual acuity consists of a result for near and a result for distance, both of which have been tested with the individual wearing their appropriate glasses or contact lenses. It can be difficult to gain a near vision result in young children, so a result for distance visual acuity only may be reported.

#### 3.1 Near Vision

Near vision is recorded as an N series and the commonly used notations for near vision results appear in Table 1, with the severity of the vision impairment indicated according to the standard of near vision.

**Table 1: Near Vision**

N5 (Highest level near vision)	<b>No Vision Impairment</b>
N6	
N7	<b>Mild Vision Impairment</b>
N8	
N10	<b>Moderate Vision Impairment</b>
N12	
N16	
N18	
N20	<b>Severe Vision Impairment</b>
N24	
N32	
N36	
N48 (Lowest level near vision)	

### 3.2 Distance Visual Acuity

Visual acuity is also tested at distances away from the near position, known as distance visual acuity. Distance visual acuity is commonly recorded using Snellens notations that appears as a fraction. Appendix 3 provides examples of commonly used Snellens notations that represent distance visual acuity.

Table 2 provides ranges of visual acuity according to age, when the Teller Acuity Cards have been used. Due to the nature of this test, vision impairment can only be suspected up to 36 months of age. Depending on the child, from 37 months of age the severity of vision impairment can usually be determined. It is important to note that visual acuity testing by Teller Acuity Cards provides an indication rather than a reliable and final outcome of visual acuity. With subsequent assessment of visual acuity using more demanding visual acuity tests, the visual acuity result may change including a higher or lower level of visual acuity for that individual.

**Table 2 Binocular Corrected Visual Acuity by Teller Acuity Cards tested at a distance of 38 cms**

	<b>Birth to 12 months</b>	<b>13 months to 18 months</b>	<b>19 months to 24 months</b>	<b>25 months to 30 months</b>	<b>31 months to 36 months</b>	<b>37 months and over</b>
Range normal for age	6/4.5 6/6 6/12 6/15 6/18 6/24 6/30 6/45 6/60	6/4.5 6/6 6/12 6/15 6/18 6/24 6/30	6/4.5 6/6 6/12 6/15 6/18 6/24	6/4.5 6/6 6/12 6/15	6/4.5 6/6 6/12	6/4.5 6/6
Vision impairment suspected	4/60 3/60 2/60 1.5/60 1/60 1/80	6/45 6/60 4/60 3/60 2/60 1.5/60 1/60 1/80	6/30 6/45 6/60 4/60 3/60 2/60 1.5/60 1/60 1/80	6/18 6/24 6/30 6/45 6/60 4/60 3/60 2/60 1.5/60 1/60 1/80	6/15 6/18 6/24 6/30 6/45 6/60 4/60 3/60 2/60 1.5/60 1/60 1/80	6/12 6/15 6/18 6/24 6/30 6/45 6/60 4/60 3/60 2/60 1.5/60 1/60 1/80

Table 3 provides ranges of visual acuity according to age, when the Cardiff Acuity Test has been used. Due to the nature of this test, vision impairment can only be suspected up to 36 months of age. Depending on the child, from 37 months of age the severity of vision impairment can usually be determined.

**Table 3: Binocular Corrected Visual Acuity by Cardiff Acuity Test tested at a distance of 50 cms**

	<b>12 months to 17 months</b>	<b>18 months to 23 months</b>	<b>24 months to 29 months</b>	<b>30 to 36 months</b>	<b>37 months and older</b>
Range normal for age, no Vision Impairment	6/6 6/7.5 6/12 6/15 6/19 6/24 6/30 6/38 6/48	6/6 6/7.5 6/12 6/15 6/19 6/24	6/6 6/7.5 6/12 6/15	6/6 6/7.5 6/12	6/6 6/7.5
Vision impairment suspected	6/60 6/76 6/96	6/30 6/38 6/48 6/60 6/76 6/96	6/19 6/24 6/30 6/38 6/48 6/60 6/76 6/96	6/15 6/19 6/24 6/30 6/38 6/48 6/60 6/76 6/96	6/12 6/15 6/19 6/24 6/30 6/38 6/48 6/60 6/76 6/96

Table 4 provides common visual acuity results using Snellens notations including tests that are conducted at 6 metres, 3 metres and when the testing distance is varied to less than 6 metres, with test type size modified.

**Table 4: Binocular Corrected Snellens Visual Acuity Notations**

	Tested at 6 metres	Tested at 3 metres
<b>No Vision Impairment</b>	6/6	3/3
	6/7.5	
	6/9	3/4.5
	6/12	3/6
<b>Mild Vision Impairment</b>	6/18	3/9
<b>Moderate Vision Impairment</b>	6/24	3/12
	6/36	3/18
	6/48	3/24
	6/60	3/30
<b>Severe Vision Impairment</b>	Testing distance reduced from 6 metres to 5 metres: 5/60 (6/72 equivalent)	
	Testing distance reduced from 6 metres to 4 metres: 4/60 (6/90 equivalent)	
	Testing distance reduced from 6 metres to 3 metres: 3/60 (6/120 equivalent)	
<b>Blindness</b>	Testing distance reduced from 6 metres to 2 metres: 2/60 (6/180 equivalent)	
	Testing distance reduced from 6 metres to 1 metre: 1/60 (6/360 equivalent)	
	Testing distance reduced from 6 metres to 1 metre: 1/120 (6/720 equivalent)	

Table 5 provides common visual acuity results using LogMAR notations.

**Table 5: Binocular Corrected LogMAR Visual Acuity Notations**

	LogMAR Notation
<b>No Vision Impairment</b>	0.0
	0.1
	0.2
	0.3
	0.4
<b>Mild Vision Impairment</b>	0.5
<b>Moderate Vision Impairment</b>	0.6
	0.7
	0.8
	0.9
	1.0
<b>Severe Vision Impairment</b>	1.1
	1.2
	1.3
	1.4
<b>Blindness</b>	1.5
	1.6
	1.8
	1.9



### **3.3 Calculating the Binocular Visual Acuity to determine the Severity of Vision Impairment**

Clinically, visual acuity is tested and reported one eye at a time. The severity of vision impairment can only be determined by taking into account the visual acuity of both of the individual's eyes, known as binocular visual acuity. When visual acuity is reported per eye, the binocular visual acuity can be approximated from the visual acuity of the better-seeing eye. For example, the right visual acuity is 6/60 (often recorded as RE 6/60) and the left visual acuity is 6/24 (often recorded as LE 6/24). The better-seeing eye is the left eye with visual acuity of 6/24, and the binocular visual acuity will be approximately 6/24.

Individuals with nystagmus may show a significant improvement in binocular visual acuity when compared to the visual acuity of both of the individual's eyes. For example, the right visual acuity is 6/60, the left visual acuity is 6/60 and the binocular visual acuity could potentially be 6/24. This is due to the fact that the impact of the nystagmus lessens when the individual is viewing using both eyes.

#### 4. Testing and Recording Visual Fields

Visual fields refer to peripheral vision or how far into the periphery vision extends. Some eye and vision conditions cause damage to the peripheral vision, known as visual field defects. Visual field defects can result in vision impairment. Examples of common visual field defects appear in Appendix 5.

A variety of visual field tests are available, and the clinician will choose the test based on the individual's cooperation and their capacity to participate in testing. Generally visual field testing is quite challenging for children to participate in and therefore is often not reported. The WHO ICD-10 is not used in this guide when categorizing visual field defects, as it is limited in this capacity.

When the outcome of visual field testing is available and indicates visual field defect/s, this must be considered with the individual's binocular distance visual acuity, to determine the severity of vision impairment. Table 6 indicates the severity of the vision impairment according to the distance visual acuity and visual field defect.

**Table 6: To be used when Binocular Distance Visual Acuity and Visual Field Defects are reported**

<b>Table 6: Binocular Distance Visual Acuity and Visual Field Defects Reported</b>	
<b>Moderate Vision Impairment</b>	Binocular visual field of < 20 degrees with visual acuity of 6/6, 6/7.5, 6/9 or 6/12, 6/18, 6/24 or 6/36  Visual field loss of Homonymous Hemianopia with visual acuity of 6/6, 6/7.5, 6/9 or 6/12
<b>Severe Vision Impairment</b>	Binocular visual field of < 20 degrees with visual acuity of 6/60, 5/60, 4/60, 3/60 2/60 or 1/60  Binocular visual field of < 10 degrees, regardless of visual acuity level  Visual field loss of Homonymous Hemianopia with visual acuity level less than 6/18

It is recommended that expert opinion be sought when other types of visual field defects are reported. Examples of these visual field defects include scotomas and quadrantanopias (see Appendix 5). The expert opinion will be able to clarify the impact of these visual field defects on the individual.

## 5. Determining the Severity of Vision Impairment

Reports from the clinical assessment of an individual's eyes will usually provide distance visual acuity, near visual acuity and less commonly, results of visual field assessments. These results are applied to Tables 1 - 6 provided in this guide, to determine the severity of vision impairment.

To ensure accurate interpretation of clinical results to determine the severity of vision impairment, the following should be adhered to:

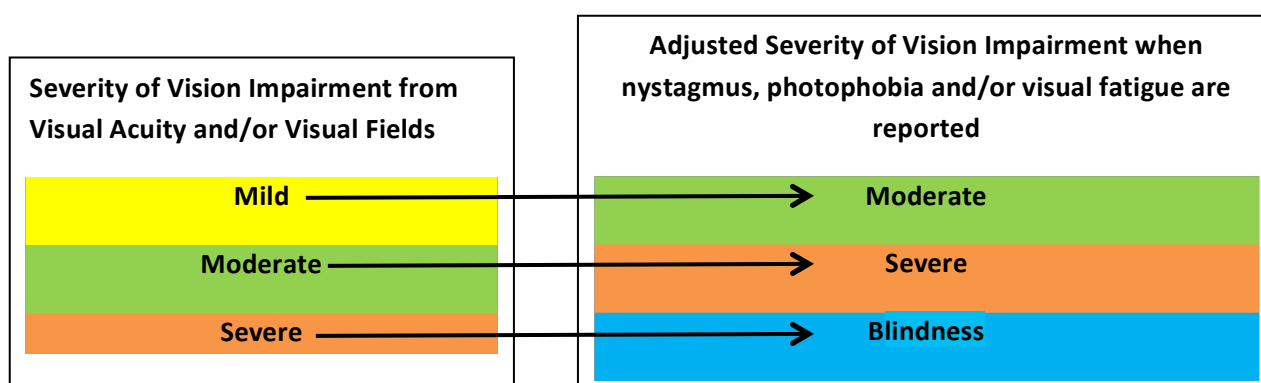
- **When Distance Visual Acuity Results are reported:** calculate the binocular visual acuity then apply to either Table 2, 3, 4 or 5, depending on the visual acuity test that has been used.
- **When Near Vision and Distance Visual Acuity Results are reported:** calculate the binocular visual acuity then apply to either Table 1, 2, 3, 4 or 5, depending on the visual acuity test that has been used. If a discrepancy occurs between the severity of vision impairment for near vision and distance visual acuity, the more severe vision impairment should be applied.
- **When Distance Visual Acuity and Visual Field Results are reported:** calculate the binocular visual acuity and the visual field defect and then apply to Table 6.

## 5.1 Factors to consider in addition to Visual Acuity and Visual Fields

Additional factors as well as visual acuity and visual fields need to be considered when determining the severity of vision impairment.

### 5.1.1 Determining the Severity of Vision Impairment when Nystagmus, Photophobia and/or Visual Fatigue are reported

The severity of vision impairment in an individual should first be determined based on the clinical results provided, i.e. visual acuity and visual fields. To adjust for the impact of nystagmus, photophobia and/or visual fatigue, the severity of vision impairment should then be determined as one level lower than indicated from visual acuity and visual fields. This is outlined in the following:



### 5.1.3 Determining the Severity of Vision Impairment when an individual has Cortical Vision Impairment

Any individual with a diagnosis of Cortical Vision Impairment (CVI) should be considered to have severe vision impairment, regardless of the reported visual acuity. This is due to the variable nature of this condition. The clinician may also report an individual with CVI as being blind.

### 5.1.4 Determining the Severity of Vision Impairment when an individual has Dual Sensory Loss or Deafblindness

Any individual with a diagnosis of Dual Sensory Loss or Deafblindness should be considered to have severe vision impairment, regardless of the reported visual acuity. This is due to the combined influence of vision and hearing impairment.

### **5.1.5 Determining the Severity of Vision Impairment when an individual has a Deteriorating Condition**

Some individuals will be diagnosed with eye conditions that will deteriorate in the future to severe vision impairment and blindness. These individuals may initially have clinical results that are within normal limits, despite their diagnosis. The onset of the vision loss maybe sudden and severe, so these individuals should be considered to have moderate vision impairment from the time of their diagnosis. Examples of diagnoses include Age Related Macular Degeneration (wet and dry); Retinal Dystrophy; Retinitis Pigmentosa; Stargardt's Disease; Stickler's Syndrome; High Myopia and Retinal Detachment.

### **5.1.6 Determining the Severity of Vision Impairment when an individual has Neurological Visual Disturbance**

Some individuals who have a brain injury may have intact visual acuity and visual fields but a disturbance to specific areas of their visual functioning such as altered visual recognition and perception. Individuals with brain injury may also have defects of their eye movements systems. It is recommended that expert opinion be sought when an individual has a history of brain injury.

## **5.2 Determining the Severity of Vision Impairment when Visual Acuity is not reported**

When a clinician indicates that it has not been possible to test an individual's visual acuity, the individual should be considered to have severe vision impairment until future retesting indicates otherwise.

A clinician may record that the individual demonstrates visual behaviours such as fixing and following or turning their head to a light source, rather than a specific visual acuity. The individual should be considered to have severe vision impairment until future retesting indicates otherwise.

## Appendix 1

World Health Organization International Classification of Disease Version 10 (ICD-10)

Downloaded from: <http://apps.who.int/classifications/icd10/browse/2010/en#/H53-H54>

The table below provides a classification of severity of visual impairment recommended by the Resolution of the International Council of Ophthalmology (2002) and the Recommendations of the WHO Consultation on "Development of Standards for Characterization of Vision Loss and Visual Functioning" (Sept 2003)

If the extent of the visual field is taken into account, patients with a visual field of the better eye no greater than 10° in radius around central fixation should be placed under category 3.

Category	Presenting distance visual acuity	
	Worse than:	Equal to or better than:
0 Mild or no visual impairment		6/18 3/10 (0.3) 20/70
1 Moderate visual impairment	6/18 3/10 (0.3) 20/70	6/60 1/10 (0.1) 20/200
2 Severe visual impairment	6/60 1/10 (0.1) 20/200	3/60 1/20 (0.05) 20/400
3 Blindness	3/60 1/20 (0.05) 20/400	1/60* 1/50 (0.02) 5/300 (20/1200)
4 Blindness	1/60* 1/50 (0.02) 5/300 (20/1200)	light perception
5 Blindness	No light perception	
9	Undetermined or unspecified	
	* or counts fingers (CF) at 1 metre.	

## Appendix 2

The table below provides standard visual acuity tests used for children and testing distances. To ensure accuracy of visual acuity results, these tests must be performed at the distance indicated.

<b>Name of Visual Acuity Test</b>	<b>Typical age of child when test is used</b>	<b>Testing Distance</b>
Teller Acuity Cards	Birth to 36 months	38 cms
Cardiff Acuity Test	12 to 36 months	50 cms
Kays Pictures	24 to 36 months	3 metres or 6 metres
Lea Symbols	36 months	3 metres
HOTV Test	36 months	3 metres or 4 metres
Sheridan Gardiner	48 months	3 metres or 6 metres
Snellens	60 months	6 metres
LogMAR	60 months	3 metres or 6 metres

## Appendix 3

The table below provides commonly recorded Snellens Notations with typical ranges of visual acuity results when tested from 6 metres to 1 metre.

Testing Distance	Visual acuity	Ranges
6 metres	6/4.5	6/4.5 is the highest level of visual acuity and 6/60 is the lowest level of visual acuity at a testing distance of 6 metres
	6/6	
	6/7.5	
	6/9	
	6/12	
	6/18	
	6/24	
	6/36	
	6/60	
5 metres	5/24	5/24 is the highest level of visual acuity and 5/60 is the lowest level of visual acuity at a testing distance of 5 metres
	5/36	
	5/60	
4 metres	4/24	4/24 is the highest level of visual acuity and 4/60 is the lowest level of visual acuity at a testing distance of 4 metres
	4/36	
	4/60	
3 metres	3/24	3/24 is the highest level of visual acuity and 3/60 is the lowest level of visual acuity at a testing distance of 3 metres
	3/36	
	3/60	
2 metres	2/24	2/24 is the highest level of visual acuity and 2/60 is the lowest level of visual acuity at a testing distance of 2 metres
	2/36	
	2/60	
1 metre	1/24	1/24 is the highest level of visual acuity and 1/60 is the lowest level of visual acuity at a testing distance of 1 metre
	1/36	
	1/60	
Approximately 1 metre	Count Fingers (CF)	
Approximately 1 metre	Hand Movements (HM)	
Approximately 1 metre	Light Perception (LP)	



## Appendix 4

The table below provides examples of commonly used Snellens notations that indicate distance visual acuity, including when the testing distance is varied from the standard 6 metre distance to 5, 4, 3, 2 or 1 metre. The severity of the vision impairment is indicated by the WHO ICD-10 categories.

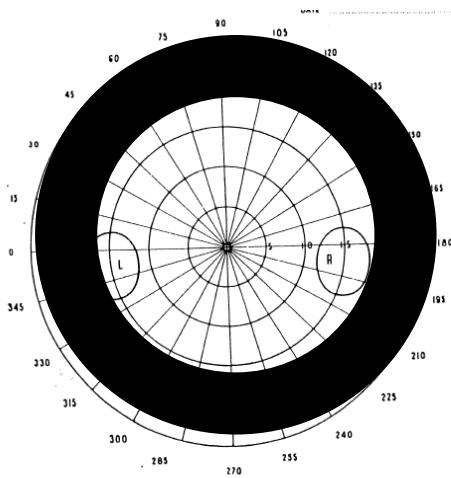
Testing Distance	Visual Acuity	WHO ICD-10 Categories for Vision Impairment
6 metres	6/4.5 (Highest level distance visual acuity)	
	6/7.5	
	6/6	
	6/9	
	6/12	
	6/18	Mild vision impairment
	6/24	Moderate vision impairment
	6/36	
	6/60	
5 metres	5/24	Severe vision impairment
	5/36	
	5/60	
4 metres	4/24	
	4/36	
	4/60	
3 metres	3/24	
	3/36	
	3/60	
2 metres	2/24	Blindness
	2/36	
	2/60	
1 metre	1/24	
	1/36	
	1/60	
Approximately 1 metre	Count Fingers (CF)	
Approximately 1 metre	Hand Movements (HM)	
Approximately 1 metre	Light Perception (LP) (Lowest level distance visual acuity)	

## Appendix 5

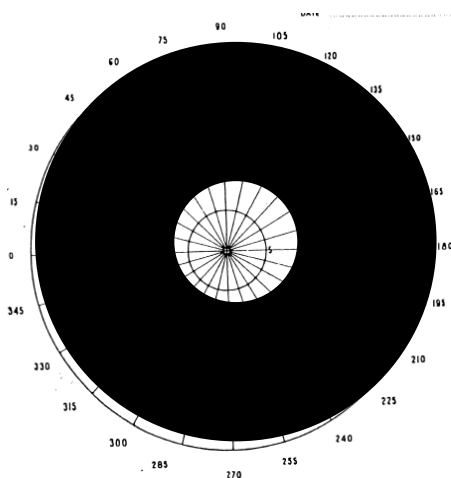
Below are examples of common visual field defects recorded from a Bjerrums Visual Field Test.

A variety of visual field test results may be presented by a clinician, the most common from a Humphrey Visual Field Analyser, which will provide a substantially different appearance than those shown below.

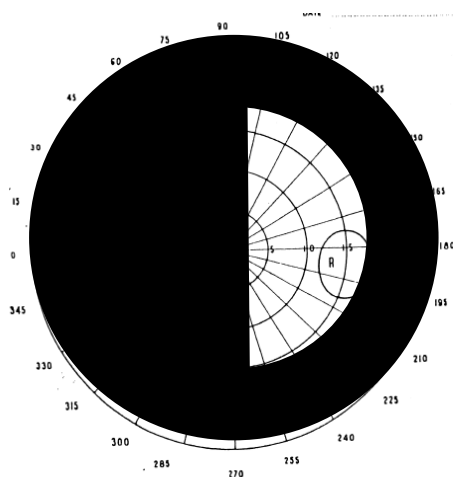
Example of Binocular Visual Field < 20 degrees



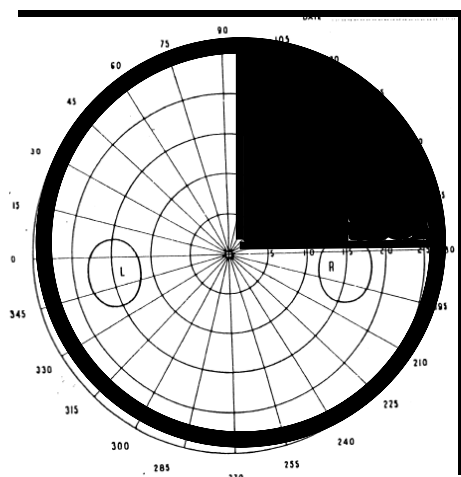
Example of Binocular Visual Field < 10 degrees



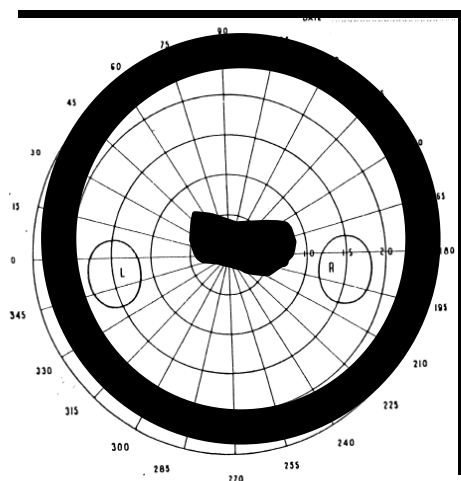
Example of Binocular Visual Field with Left Homonymous Hemianopia



Example of Binocular Visual Field with Right Quadrantanopia



Example of Binocular Visual Field with Scotoma



## Glossary

**Albinism:** a lack of pigment in the eyes, skin and hair, usually associated with reduced vision, glare sensitivity and nystagmus. There are various types of Albinism including Oculocutaneous Albinism in which the eyes and other body systems are affected and Ocular Albinism in which only the eyes are affected.

**Amblyopia:** reduced vision in one or both eyes without detectable damage to the eyes or visual pathways. It occurs when there is no transmission or poor transmission of the visual image to the brain during the period of visual development in childhood.

Adults can also develop a form of amblyopia, related to toxicity, e.g. from drug and alcohol abuse.

**Amsler Grid:** a test that is used to detect distortions of the central visual field.

**Aniridia:** an absence of the iris or the coloured part of the eye. The pupil is large and the condition is present in both eyes. Aniridia can be associated with glaucoma, nystagmus, sensitivity to light and poor vision.

**Anophthalmia:** the absence of an eyeball.

**Aphakia:** the absence of the intraocular lens.

**Astigmatism:** refractive error due to the front of the eye being asymmetrically curved.

**Cardiff Acuity Test:** assesses visual acuity in infants, nonverbal children and adults. An estimate of distance vision is obtained by observing the visual response to pictures on cards.

**Cataract:** the clouding of the intraocular lens which may prevent a clear image being received by the retina. Cataracts in children are a complex eye disease which despite treatment, can cause vision impairment. Cataracts in adults are a treatable with surgery and intraocular lens implantation, usually without associated vision impairment.

**Central scotoma:** the loss of the central 5 degrees of visual field.

**Coloboma:** a cleft in the eye that occurs when the eye is not fully formed. The cleft can affect the entire eye or specific parts of the eye.

**Cone Dystrophy:** the degeneration of cones (light receptors) in the retina. This results in decreased central vision, reduced colour vision and sensitivity to bright light. Peripheral vision (side vision) may be used more than central vision.

**Confrontation Visual Field Test:** a gross assessment of the visual field. The individual is encouraged to look directly at a target while their response to objects presented in their peripheral visual field is observed.

**Congenital Rubella:** a viral infection which can cause vision impairment in the child if contracted during the first trimester of the mother's pregnancy. Retinal changes, cataract and glaucoma may lead to vision impairment. Many of the body systems are also affected by Congenital Rubella including the heart, spleen, liver and bone marrow.

**Congenital Stationary Night Blindness (CSNB):** a non-progressive retinal disorder, characterised by poor vision in dim lighting conditions. Those affected often have reduced visual acuity, myopia, nystagmus and strabismus.

**Cortical Vision Impairment (CVI):** a reduction or absence of vision caused by damage to areas of the posterior visual pathway and/or the visual cortex. Often there is no abnormality of the eye.

**Cytomegalovirus (CMV):** a viral infection that can affect the eyes of an unborn child. The viral infection affects the development of the retina.

**Deafblindness:** also known as Dual Sensory Impairment, is caused by many conditions with the two impairments together increasing the effects of the other.

**Delayed Visual Maturation:** occurs when a baby does not fix and follow but has an otherwise normal eye examination. By approximately 6 months of age, the child will begin to demonstrate visual responses and will start to fix and follow. With time, they begin to function as a visually normal child.

DMV may be used as a preliminary diagnosis to describe the child's apparent lack of vision. This may be revised if and when subsequent diagnoses are reached such as CVI.

**Diabetic Retinopathy:** a complication of diabetes which causes damage to the blood vessels which supply the retina, resulting in vision impairment.

**Eccentric fixation:** the use of other parts of the retina, other than the fovea, for fixation.

**Electroretinogram (ERG):** a method of assessing vision by measuring retinal function that does not require the individual's active participation.

**Glaucoma:** a group of diseases characterized by damage to the optic nerve that often occurs when the eye pressure is elevated and can result in reduced vision and loss of visual field. Infants with glaucoma typically have different signs and symptoms than adults.

**Goldenhar's Syndrome:** involves the incomplete formation of the ear, nose, soft palate, lip and jaw. Benign growths on the eye (dermoids), skin tags in front of the ear, and eye misalignment are common findings.

**Hemianopia:** a visual field defect of half of the left or right visual field.

**Hypermetropia/Hyperopia:** the most common refractive error in children, also called longsightedness. The hypermetropic eye is often smaller or shorter in length and lacks focussing power. This can be compensated for by use of glasses and contact lenses.

**Iridodonesis:** trembling of the iris during eye movement, which occurs in an eye with a dislocated lens.

**Kay Picture Test:** a visual acuity test that has pictures, rather than letters, and is often used to assess children if they are unable to match symbols or letters.

**Keratoconus:** a degenerative disease affecting the cornea which gradually thins and forms a conical shape.

**Latent Nystagmus:** jerky, involuntary eye movements that only occur when one eye is covered.

**Lea Symbol Test:** used for assessing visual acuity. It has symbols, rather than letters, and is often used to assess young children.

**Leber's Congenital Amaurosis (LCA):** an eye disorder characterised by markedly reduced retinal function detected by electrophysiological testing. Nystagmus, reduced or absent pupil responses and severe vision impairment are usually associated.

**LogMAR Chart:** a distance visual acuity test. It has 5 letters per row with uniform spacing between letters and rows, ensuring equal 'crowding' for each letter. The LogMAR chart is the gold standard visual acuity test.

**Low Vision Aids:** Prescription and non-prescription devices that help people with vision impairment by enhancing their remaining vision.

**Maclure:** a near test that contains reading material that is categorized into average levels of reading ability expected for different age groups. The test is composed of paragraphs of text which provide an accurate measure of near vision.

**Macular Dystrophy:** usually results in blurred central vision, poor colour vision and sensitivity to light. It affects the macula and is not a single diagnosis.

**Microphthalmia:** an abnormally small eyeball due to developmental problems in utero.

**Monocular Vision Testing:** vision testing involving testing one eye at a time by covering the eye not being assessed. It allows the vision in each eye to be compared and monitored over time.

**Myopia:** also known as shortsightedness is a refractive error that occurs when the focusing mechanisms of the eye are over-powered. Glasses are required to correctly focus the image on to the retina. High levels of myopia are associated with some eye conditions which cause vision impairment.

**Neurofibromatosis:** 2 types – Neurofibromatosis Type 1 and Neurofibromatosis Type 2; in type 2 the individual is more severely affected. Both types are associated with neurofibromas or nerve tissue tumours, which can affect the optic nerve or areas within the brain associated with vision causing vision impairment.

**Null point:** the position of the eyes where nystagmus is minimal and vision is optimal.

**Nystagmus:** fast, involuntary, repetitive eye movements that can be horizontal, vertical or rotary.

**Oculomotor Apraxia:** the inability to make voluntary horizontal eye movements. Most children with oculomotor apraxia must utilize a head thrust to initiate horizontal eye movement away from the straight-ahead gaze position. Typically, vertical eye movements are unaffected by the condition.

**Optic Atrophy:** the degeneration of the optic nerve which carries visual information from the retina to the brain. Vision loss will vary depending on the severity of the atrophy.

**Optic Nerve Hypoplasia:** the underdevelopment of the optic nerve, characterised by a small optic disc.

**Peripheral vision:** the outer edge of vision which assists with mobility and vision in reduced illumination.

**Peters' Anomaly:** part of a disease that causes corneal clouding due to failure of the normal development of the anterior segment of the eye. The corneal clouding can cause severe amblyopia. Peters' Anomaly is also associated with many other ocular problems.

**Persistent Hyperplastic Primary Vitreous (PHPV) or Persistent Foetal Vasculature (PFV):** occurs when the eye does not develop normally. The vitreous (jelly-like substance in the back of the eye) is often scarred and opaque. The hazy vitreous blocks light passing to the back of the eye. This leads to blurred vision.

**Photophobia:** abnormal sensitivity to light that causes reduced vision and discomfort.

**Ptosis:** refers to a drooping of the upper eyelid.

**Reduced Snellens Test:** used to assess near vision.

**Retinal Detachment:** detachment of the retina from the interior of the eye. This commonly occurs in people with high myopia (shortsightedness), degenerative retinal conditions and can be a consequence of Retinopathy of Prematurity. Generally, the vision impairment is often sudden and severe when the retina detaches.

**Retinal Dystrophy:** degenerative ocular condition affecting the photoreceptors of the retina (cones and rods). Poor rod function results in night blindness, which is an inability to see in dim light. Poor cone function results in decreased central vision and reduced colour vision.

**Retinitis Pigmentosa (RP):** an inherited, progressive retinal degeneration in both eyes resulting in night blindness and constricted visual fields.

**Retinoblastoma:** a malignant tumour of the eye(s) that originates from the retina. One (unilateral) or both (bilateral) eyes may be affected and typically occurs in children less than 5 years old.

**Retinopathy of Prematurity (ROP):** retinal changes that occur in some premature babies. Blood vessels in the eye grow abnormally which may lead to scarring and retinal detachment.

**Retinoschisis:** an inherited degenerative retinal condition which causes a progressive loss of visual acuity and visual field from retinal splitting and retinal detachment. It typically begins in childhood and the individual may only become aware of changes to their vision in adolescence.

**Rieger Anomaly:** characterised by congenital iris abnormalities, including abnormally situated pupils (correctopia), iris degeneration and multiple pupils (polycoria). Glaucoma and photophobia are common findings. Rieger anomaly is part of Axenfeld-Rieger syndrome.

**Rod Cone Dystrophy:** the name given to a wide range of eye conditions which have dysfunction of the retinal cells – the rods and cones.

**Sheridan Gardiner (SG) Chart or Single Letters:** visual acuity test that is composed of 7 reversible letters.

**Sonksen LogMAR Test - Near Chart:** near visual acuity test using LogMAR notation. It has 4 letters per row with uniform spacing and crowding.

**Snellens Chart:** a distance visual acuity test composed of letters.

**Septo-Optic Dysplasia:** describes abnormal brain structures, including the pituitary gland and optic nerve hypoplasia. Growth hormone deficiency may result in delayed growth and development of the child.

**Stargardt's Disease:** an inherited macular degeneration that usually onsets in childhood or adolescence and causes progressive vision loss. Symptoms include wavy vision, blind spots, blurriness, impaired colour vision, sensitivity to glare and difficulty adapting to dim lighting.

**Strabismus/Squint:** medical term used to describe any misalignment of the eyes.

**Teller Acuity Cards:** assess visual acuity in infants and nonverbal children and adults. The test consists of a series of cards with black and white stripes of varying widths. An estimate of distance visual acuity is obtained by observing the visual response to each card.

**Toxoplasmosis:** an infection caused by a parasite. In the eye, Toxoplasma infections frequently cause significant inflammation and subsequent scarring which may temporarily or permanently impair vision. Transmission usually occurs during pregnancy from mother to child.

**Usher Syndrome:** a genetic condition characterised by congenital deafness and progressive loss of vision due to Retinitis Pigmentosa.

**Uveitis:** the inflammation of any structures of the uvea, i.e. the iris, ciliary body and choroid.

**Visual Acuity (VA):** a measurement of how well a person can see fine detail. It refers to the clarity of vision. Visual acuity is recorded as a fraction. Normal visual acuity is recorded as 6/6.

**Vision Impairment:** defined as reduced vision that cannot be restored or corrected by glasses, contact lenses, surgery or pharmacological means. Vision impairment can be caused by conditions that affect the eye, the connections between the eye and brain, or parts of the brain involved with vision. Vision impairment can be exacerbated by environmental conditions, and an individual's general wellness and cognitive functioning. Vision impairment commonly occurs in individuals who have other disabilities.

**Visual Field:** the full extent of the area of vision, including central vision as well as peripheral.

**Visually Evoked Potential (VEP):** a computerised recording of electrical activity at the back of the brain (occipital cortex) to determine defects in the retina-to-brain visual pathway.

*This Glossary is based on the Parent Glossary from the Royal Institute for Deaf and Blind Children.*